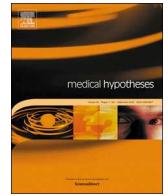




Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Routine childhood immunization may protect against COVID-19



To the editor,

Coronavirus diseases (COVID-19) is an emerging pandemic disease as declared by WHO in March 2020 [1]. It is caused by coronavirus 2 (SARS-CoV-2) and presented by fever, sore throat and complicated by pneumonia and severe acute respiratory distress. SARS-CoV-2 is single-stranded RNA virus belongs to Betacoronavirus [2]. Different age groups are susceptible to infection, however SARS-CoV, MERS-CoV and SARS-CoV-2 seem to less commonly infect children and to cause milder symptoms, and are associated with much lower case-fatality rates and most of them recover quickly from the infection [3].

This mysterious lower rate of fatality and symptomatic illness could be advocated to the global active viral immunization of children from birth till six years. For example, varicella, Hepatitis B, MMR, Poliomyelitis, and rotavirus [4]. All of these immunizations together, with special concern for vaccines that result in transient rather than long-lasting as in mumps, rubella, poliomyelitis, Hepatitis B, and varicella build the immunity against SARS-CoV-2 protecting lung cells from invasion. Cross reactivity between vaccination and other viral genus was been stated as that occurred when serum antibodies of HIV emerged after measles vaccination [5]. Most routine viral vaccines are either inactivated or killed vaccines stimulate T Helper 1 cells (CD4+) to secrete many different types of cytokines as interferon gamma, interleukin-2 (IL-2), and IL-12. IL-2 provokes the maturation of the killer T cell and improve the cytotoxicity of natural killer cells recognizing and destroying cells infected with viruses [5]. Another theory for children sparing by COVID-19 could be the low immunity in childhood that doesn't exaggerate the immune response against the virus as adult do [6].

MMR is already been used to induce by stander immunity against other virus strains. For example, in dermatology field, warts that caused by human papilloma virus could be ameliorated using intralesional MMR vaccine. For the same purpose, we recommend using one or combined vaccination of varicella, Hepatitis B, MMR, Poliomyelitis, or rotavirus to either protect or treat the emerging epidemic of COVID-19 [6]. We recommend several clinical trials to be taken for assessing their prophylactic and/ or therapeutic efficacy in the emerging COVID-19.

Funding sources

The article has no funding source

Prior presentation

No data from this manuscript were presented in a scientific meeting before.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.mehy.2020.109689>.

References

- [1] Liu J, Liao X, Qian S, Yuan J, Wang F, Liu Y, et al. Community Transmission of Severe Acute Respiratory Syndrome Coronavirus 2, Shenzhen, China, 2020. *Emerg Infect Dis J* [Internet] 2020;26(6). Available from: https://wwwnc.cdc.gov/eid/article/26/6/20-0239_article.
- [2] Lu Q, Shi Y. Coronavirus disease (COVID-19) and neonate: What neonatologist need to know. *J Med Virol* [Internet] 2020 Mar 1;n/a(n/a). Available from: <https://doi.org/10.1002/jmv.25740>.
- [3] Features C. Coronavirus Infections in Children Including COVID-19. 2020;XX (XX):1–14.
- [4] Steinglass R. Routine immunization: an essential but wobbly platform. *Glob Heal Sci Pract* [Internet] 2013;1(3):295–301. Available from <https://pubmed.ncbi.nlm.nih.gov/25276544>.
- [5] Baskar PV, Collins GD, Dorsey-Cooper BA, Pyle RS, Nagel JE, Dwyer D, et al. Serum antibodies to HIV-1 are produced post-measles virus infection: evidence for cross-reactivity with HLA. *Clin Exp Immunol* [Internet] 1998 Feb;111(2):251–6. Available from <https://pubmed.ncbi.nlm.nih.gov/9486389>.
- [6] Salman S, Ahmed MS, Ibrahim AM, Mattar OM, El-Shirbiny H, Sarsik S, et al. Intralesional immunotherapy for the treatment of warts: a network meta-analysis. *J Am Acad Dermatol* [Internet] 2018 Available from: <https://doi.org/10.1016/j.jaad.2018.07.003>.

Samar Salman^{a,*}, Mohamed Labib Salem^b

^a Department of Dermatology and Venereology, Tanta University Hospital, Faculty of Medicine, Tanta University, Tanta, Egypt

^b Department of Zoology, Faculty of Science, Immunology and Biotechnology Unit, Center of Excellence in Cancer Research, Tanta University Teaching Hospital, Tanta University, Tanta, Egypt

E-mail address: Samarsalman26@gmail.com (S. Salman).

* Corresponding author at: Department of Dermatology and Venereology, Tanta University Hospital, Faculty of Medicine, Tanta University, Tanta 31511, Egypt.